

PROCEEDINGS  
OF THE  
CALIFORNIA ACADEMY OF SCIENCES

Fourth Series

VOL. XXIV, No. 4, pp. 133-152, pl. 8

MARCH 31, 1942

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CONTRIBUTIONS TOWARD A KNOWLEDGE OF THE  
INSECT FAUNA OF LOWER CALIFORNIA\*

No. 4

NEUROPTERA: MYRMELEONIDAE

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THE FIRST myrmeleonid recorded from Baja California was *Brachynemurus longipalpis*, described by Hagen in 1888 from specimens from California and some from the Cape region of Baja California collected by John Xantus in 1860.

In September 1894 Dr. G. Eisen and Mr. F. H. Vaslit made a general collection on the peninsula, mostly from near the tip, and the myrmeleonids were published by the present author in 1895.

In the same year (1894) a Frenchman, M. Leon Diguët, spent several months in this region and collected insects for the Paris Museum, and the myrmeleonids were later (1913 to 1920) published by the Rev. P. Longinos Navás. He was probably unaware of some of the earlier papers, as most, if not all, of his species appear to be synonyms. All of these collections, however, contained but few species.

In 1938 Messrs. E. S. Ross and A. E. Michelbacher made the first real collection. From the latter part of June till early in August they obtained about

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\* Printed from the John W. Hendrie Publication Endowment.

700 specimens, a fine showing. In 1921 Mr. E. P. Van Duzee visited several of the islands in the Gulf of California and gathered about 25 myrmeleonids. These with the others contain twenty-seven species and two varieties, eight species and one variety being new.

Collections made earlier and later will add others to the list.

Of the described species nearly all occur in southern California and east to New Mexico, or even western Texas. Little is known of the myrmeleonids of the western Mexican mainland. Messrs. Eisen and Vaslit collected at Tepic one species (*Hesperoleon mexicanum*) not yet taken in Baja California. One interesting point is the finding of another species of *Puren*, a genus originally described from Chile, and also known from one species in New Mexico and Utah.

SYNOPSIS OF THE GENERA

- 1. In fore wing the second anal vein runs in an even curve, not close to first anal; radial sector usually arises before the cubital fork.....2
- In fore wing the second anal vein runs close to the first anal then bends down at an angle and unites for some distance with the third anal.....8
- 2. In hind wing the first anal runs parallel to the cubital fork for some distance, and is connected thereto by several cross-veins.....3
- In hind wing the first anal ends about at or before forking of cubitus, at most with one cross-vein to cubital fork.....6
- 3. Fore wing with costal area partly divided into two series of cells.....*Calinemurus*
- Costal area of fore wing with but one series of cells (except sometimes near stigma) . . .4
- 4. Labial palpi much elongated, longer than front tarsus..... *Scotoleon*
- Labial palpi not so elongate.....5
- 5. Front coxae and front femora with row of long curved white hairs.....*Netroneurus*
- Front coxae and femora without a row of long white hairs, sometimes one on coxa  
.....*Hesperoleon*
- 6. No tibial spurs; basal tarsal joint longer than the fifth.....*Maracandula*
- Tibial spurs present.....7
- 7. Legs very slender; front tibia as long as front femur; mesonotum with enlarged bristles above .....*Chaetoleon*
- Legs stouter; front tibia shorter than front femur; mesonotum with only simple bristles above .....*Austroleon*
- 8. In hind wing but one (or rarely two) cross-veins before origin of radial sector, latter point before cubital forking.....9
- In hind wing four (or more) cross-veins before origin of radial sector, latter point usually beyond forking of cubitus; antennae much separated at base.....11
- 9. Legs very slender; front femur about twice as long as front coxae.....*Eremoleon*
- Legs less slender.....10
- 10. Fore wing with but one series of costal cells.....*Psammoleon*
- Fore wing with two series of cells, for part way, at least.....*Puren*
- 11. Thorax with but little if any long hair; spurs only slightly curved; hair on legs shorter than the black bristles; basal tarsal joint much longer than broad.....*Myrmeleon*
- Thorax with much long, whitish hair; hair on legs much longer than black bristles; spurs much curved or bent.....12
- 12. Fore wing with but one series of costal cells; last joint of labial palpi scarcely pedicellate .....*Paranthaclisis*
- Fore wing with two series of costal cells for part way; last joint of labial palpi plainly pedicellate .....*Vella*

Navás has published the following species from the collection made by Diguët :

*Brachynemurus expansus*, Broteria XI, 48, 1913.

*Brachynemurus plectus*, Broteria XI, 49, 1913.

*Brachynemurus digueti*, Broteria XI, 50, 1913; also as *Hesperoleon digueti*, Ann. Soc. Sci. Bruxelles, 1920, 198.

*Hesperoleon planus*, Ann. Soc. Sci. Bruxelles, 1920, 200.

*Belluga implexa*, Ann. Soc. Sci. Bruxelles, 1920, 195.

*Paranthaclisis californica*, Ann. Soc. Sci. Bruxelles, 1920, 189; and in Mem. R. Acad. Cien. Artes Barcelona, XVII, 390, 1922.

*Clathroneuria exigua*, Ann. Soc. Sci. Bruxelles, 1920, 187.

*Comptessa ambitiosa*, Mem. R. Acad. Cien. Artes Barcelona, XI, 464, 1915.

The *Paranthaclisis* and the *Clathroneuria* I feel sure are synonyms as indicated in the list; the others I mention under the species to which the description applies, however there is a chance that an examination of the types (in Paris Museum) would show them to be something else, as the descriptions lack various useful details.

## Hesperoleon

### SYNOPSIS OF SPECIES

1. Abdomen with distinctly transverse pale bands above.....2
- Abdomen with pale marks elongate.....4
2. Abdomen with pale only near middle of each segment; median mark of pronotum entire .....*yavapai*
- At least several segments pale at base and at tip as well as near middle.....3
3. Last segment of labial palpi twice as broad as preceding segment; front vertex row complete; male appendages not twice as long as last segment.....*eiseni*
- Last segment of labial palpi not twice as broad as the preceding joint; front vertex row weak or absent; mesoscutellum with a small black spot each side behind; male appendages twice as long as the last segment.....*sackeni*
4. Median vein of fore wing white, almost wholly unmarked; mesoscutellum with only a median dark mark; spurs equal two tarsal joints.....*coquilletti*
- Median vein marked with dark at connecting veinlets, usually more; mesoscutellum with two spots or a double mark; spurs often shorter.....5
5. Pronotum with a median dark stripe behind, but two stripes in front.....*papago*
- Pronotum with a pair of stripes behind as well as in front.....6
6. Spurs equal to two tarsal joints; femora dotted with dark; male appendages very short .....*peninsulanus*
- Spurs little, if any, longer than basal tarsal joint.....7
7. No anterior vertex row, only the four spots of the hind row; femora more or less evenly darkened .....*quadripunctatus*
- Anterior vertex row present.....8
8. Hind femora dotted with dark; bristles on legs mostly black.....*dissimiliti*
- Hind femora (at least) largely, evenly dark to black; bristles on femora mostly white .....9
9. Lateral pronotal stripes hardly go beyond the groove; male appendages nearly equal to last segment .....*singularis*
- Lateral pronotal stripes go forward of groove; male appendages only about one half of last abdominal segment.....*intermedius*

**Hesperoleon peninsulanus** Banks, new species

Plate 8, Figure 15

This will run to *H. texanus* (Revision Nearctic Myrmeleonidae) having the same short, divergent male appendages. The marks on the pronotum are heavier than in *H. texanus*, the lateral stripes ending at the groove, and the anterior vertex band is represented only by a small spot each side by the eye, no spots in middle, the hind vertex band of the usual four spots; below the interantennal mark is a short, but very distinct, median black line.

The insect is rather larger than *H. texanus*, but readily separated from *texanus*, *4-punctatus*, *singularis*, and *dissimilis* by the much longer and larger tibial spurs, equal to two tarsal joints, and in front and mid legs a little longer; the basal joint of hind tarsus is a little more elongate than in allies. The legs are pale, the femora heavily dotted with black, and with numerous black bristles and very short black hair; on front femora above is some white hair.

The wings are marked much as in *singularis*, *quadripunctatus*, and *dissimilis*. Dark spots along the cubitus, one at end of anal vein, one at rhexma, and one at the base of the yellowish stigma; the veins brown, marked with white; many smaller spots at junction of veins and on outer forkings.

The fore wing has three or four cross-veins before radial sector, about twelve or thirteen branches to radial sector; first anal with about ten branches; cubital area crossed from near middle to tip, anal area crossed from base to middle; one series of cross-veins in apical costal area; in hind wings two or three cross-veins before radial sector; about thirteen branches to radial sector; three or four connections between anal vein and cubital fork.

Length of fore-wing 21 to 25 mm., width 5.5 to 6 mm.

Length of hind wing 20 to 23 mm., width 4.7 to 5.5 mm.

*Holotype*, (No. 4911, Mus. Calif. Acad. Sci., Ent.) and six paratypes, all from **Coyote Cove, Concepcion Bay, Lower California**, 24 July. Readily distinguished by its large spurs (fig. 15).

**Hesperoleon dissimilis** (Banks)

*Brachynemurus dissimilis* BANKS, Proc. Ent. Soc. Wash., V, 175, 1903.

*Brachynemurus peregrinus* BANKS ( *nec.* HAGEN), Proc. Calif. Acad. Sci., (2) V, 5, 18, 1895.

One from Triunfo, 13 July. The specimens taken by Eisen and Vaslit are from San José del Cabo in September. *H. planus* Navás ♂, and *H. plectus* Navás ♀ agree with this species, and probably are synonyms.

**Hesperoleon intermedius** (Currie)

*Brachynemurus intermedius* CURRIE, Proc. Ent. Soc. Wash., V, 283, 1903.

*Hesperoleon intermedius*, BANKS, Bull. Mus. Comp. Zool., LXVIII, 18, 1927.

One from twenty miles north of Mexicali, 3, IV, specimen from alcohol (Ross & Michener). Described from Arizona, and known also from southern California.



**Hesperoleon coquilletti** (Currie)

*Brachynemurus coquilletti* CURRIE, Can. Ent., XXX, 93, 1898.

*Hesperoleon coquilletti*, BANKS, Bull. Mus. Comp. Zool., LXVIII, 37, 1927.

Several from ten miles south of Catavina, 29 July; and fifteen miles west of La Paz, 6 July. Described from Arizona and southern California, and known from Kansas, Texas, New Mexico, Arizona, Utah, and Washington.

**Hesperoleon quadripunctatus** (Currie)

*Brachynemurus quadripunctatus* CURRIE, Can. Ent., XXX, 136, 1898.

*Hesperoleon quadripunctatus*, BANKS, Bull. Mus. Comp. Zool., LXVIII, 21, 1927.

One from Angeles Bay, Gulf of California, 26 June, E. P. Van Duzee. Described from Arizona and southern California.

**Hesperoleon yavapai** (Currie)

*Brachynemurus yavapai* CURRIE, Proc. Ent. Soc. Wash., V, 281, 1903.

*Hesperoleon yavapai*, BANKS, Bull. Mus. Comp. Zool., LXVIII, 34, 1927.

One of this uncommon species from Pond Island Bay, Angel de la Guardia Isl., Gulf of California, 20 June. Described from Hot Springs, Arizona, and recorded from Utah.

**Hesperoleon singularis** (Currie)

*Brachynemurus singularis* CURRIE, Proc. Ent. Soc. Wash., V, 284, 1903.

*Hesperoleon singularis*, BANKS, Bull. Mus. Comp. Zool., LXVIII, 17, 1927.

One from San Fernando, 31 July. The figure and description of *H. digueti* Navás agrees with this species, but possibly an examination of the type would show it to be different. Described from Arizona, and known also from Utah.

**Hesperoleon eiseni** (Banks)

*Brachynemurus eiseni* BANKS, Proc. Ent. Soc. Wash. IX, 33, 1907.

*Brachynemurus sackeni* BANKS, (*nec.* HAGEN), Proc. Calif. Acad. Sci. (2) V, 519, 1895.

Specimens from ten miles south of Catavina, 29 July; forty-five miles north of San Ignacio, 27 July; twenty-five miles south of Santa Rosalia, 25 July; twenty miles north of Comondu, 23 July; and Coyote Cove, Concepcion Bay, 24 July. The specimens taken by Eisen and Vaslit are from San José del Cabo, in September.

**Hesperoleon papago** (Currie)

*Brachynemurus papago* CURRIE, Can. Ent., XXXI, 361, 1899.

*Hesperoleon papago*, BANKS, Bull. Mus. Comp. Zool., LXVIII, 29, 1927.

Specimens from fifteen miles north of Punta Prieta, 29 July; and Triunfo, 13 July. Described from Arizona, and now known from Texas, Utah, New Mexico, and southern California.

**Hesperoleon sackeni** (Hagen)

*Brachynemurus sackeni* HAGEN, Can. Ent., XX, 94, 1888.

*Hesperoleon sackeni*, BANKS, Bull. Mus. Comp. Zool., LXVIII, 33, 1927.

Specimens of this common southern species come from fifteen miles north of El Refugio, 4 July; fifteen and forty-five miles north of San Ignacio, 24 and 27 July; twenty miles northwest of La Paz, 16 July; ten miles south of Catavina, 29 July; Comondu, 22 July; San Fernando, 31 July; fifteen miles north of Punta Prieta, 29 July; fourteen miles south of El Arco Mine, 23 June; seventeen miles south of Enseñada, 14 June; Mesquital, 22 June; Venancio, 17 July; ten miles southwest of San José del Cabo, 9 July; twenty miles west of Mexicali, 3 April; and Espiritu Santo Isl., Gulf of California, 31 May, Virgil Owen. It was described from Texas and California, and now known from New Mexico, Arizona, Colorado, Utah, and Nevada. Navás says of his *Clathroneuria exigua* that the appendages of the male are almost as long as the last two abdominal segments, which will fit no other species, and the remainder of the description applies fairly well. Likewise his description of *Brachynemurus expansus* ♀ will agree with *H. sackeni*, and with no other species known to me.

**Scotoleon longipalpis** (Hagen)

*Brachynemurus longipalpis* HAGEN, Can. Ent., XX, 95, 1888.

*Scotoleon longipalpis*, BANKS, Bull. Mus. Comp. Zool., LXVIII, 41, 1927.

Many specimens from numerous localities; Venancio, 17, VII; Triunfo, 7, VII; five miles south of Miraflores, 10, VII; ten miles southwest of San José del Cabo, 9, VII; fifteen miles north of El Refugio, 4, VII; twenty miles west of Santa Rosalia, 24, VI; twenty miles northwest of La Paz, 16, VII; ten miles south of Catavina, 29, VII; seventeen miles south of Enseñada, 14, VI; San Fernando, 31, VII; twenty miles west of Mexicali, 3, IV; fifteen and forty-five miles north of San Ignacio, 26, 27, VII; fifteen miles north of Punta Prieta, 29, VII; fourteen miles south of El Arco Mine, 23, VI, and Mesquital, 22, VI.

Part of the original type lot were taken by John Xantus near the tip of Baja California, and others were taken by Eisen and Vaslit. It is fairly common in southern California east to western Texas.

**Scotoleon congener** Banks, new species

Plate 8, figure 1

This species is, in general, similar to *S. longipalpis*. It is separated by the transverse black band below bases of the antennae (instead of the median spot), and in that the hind femora are distinctly evenly darkened over the apical half (instead of the dots and spots of *longipalpis*), and in that the male appendages are a little shorter and, seen from side, are plainly bent. The vertex has the two bands of dark spots, the pronotum the four stripes, the

laterals ending on the groove, all as in *S. longipalpis*. The dark on the mesonotum is about as in that species, but less lineate, the mesoscutellum with the usual two dark streaks, the metascutellum has a median dark mark (not common in *longipalpis*). The abdomen is dark; the basal segment and often the next with a pale stripe each side above, broader in males and extended further back, the hair mostly white, except toward the tip where it is black; in males with more black hair. The legs are largely pale; tips of tarsal joints darker; rarely dark spots; the hind femora darkened toward tips; bristles black, but often some white ones, particularly on the front and hind femora.

The fore wings have the markings about as in *longipalpis*, those along cubitus sometimes quite heavy. The structure is about as in *longipalpis*, except the male appendages, these are plainly a little shorter than in that species and, when viewed from side, distinctly bent in middle. The venation is similar to *longipalpis*; about nine branches to radial sector; some cells in the cubito-anal area are crossed, and sometimes a few of the anal cells toward the base crossed. The size is as with *longipalpis*.

*Holotype*, (No. 4912, Mus. Calif. Acad. Sci., Ent.) from **Chapala Dry Lake, Lower California**, June 21, M. & R.).

Paratypes come from Chapala Dry Lake, 21, VI; fifteen miles north of Punta Prieta, 29, VII; Mesquital, 28, VII; ten miles south of Catavina, 29, VII; forty-five miles north of San Ignacio, 27, VII; fifteen miles north of San Ignacio, 26, VII; twenty-five miles south of Santa Rosalia, 25, VII; San Fernando, 31, VII; San Domingo, 19, VII; Hamilton Ranch, 2, VIII; and fifteen and twenty miles northwest of La Paz, 5 and 16, VII.

### ***Calinemurus californicus* (Banks)**

*Brachynemurus californicus* BANKS, Proc. Calif. Acad. Sci., V, 519, 1895.

*Calinemurus californicus* BANKS, Ann. Ent. Soc. Amer., XXXI, 419, 1938.

Several specimens from Triunfo, 13 July; Coyote Cove, Concepcion Bay, 24 July; and twenty miles north of Comondu, 23 July. The types from San Lazaro, Sierra El Taste, and San José del Cabo. The descriptions of *Belluga implexa* Navás and of *Comptessa ambitiosa* Navás appear to refer to this species. The venation is irregular, so specimens of extremes can readily be considered distinct as was done by Navás.

### ***Calinemurus californicus* var. *fraternus* (Banks)**

*Brachynemurus fraternus* BANKS, Proc. Calif. Acad. Sci., (2) V, 520, 1895.

Described from San Lazaro and San José del Cabo as a separate species since the appendages of the male were not as long and the venation more regular; but since seeing more of *C. californicus* there is enough variation to consider this form only a variety, less heavily marked than the type. None were in the collection of Ross and Michelbacher.

**Netroneurus pulchellus** (Banks)

Plate 8, figure 2

Of this species, described from one female from Brown, Calif., there are specimens from ten miles south of Catawina, 29, VII; San Fernando, 31, VII; San Domingo, 19, VII; twenty-five miles south of Santa Rosalia, 25, VII; Pond Island Bay, Gulf of California, 30, VI; and San Marcos Island, Gulf of California, 19, VI; the last two collected by Mr. Van Duzee. The male has not been described; it resembles the female in color and structure and the abdomen is but little longer, but above with a small basal and median pale spot on each segment; the last segment is fully two thirds as long as the penultimate, and the appendages are as long as the last segment, extremely hairy, slightly divergent, and curved.

There are various specimens that are much paler which constitute a new variety.

**Netroneurus pulchellus** var. **pallescens** Banks, new variety

Plate 8, figure 12

The interantennal mark is reduced, the pronotum is almost wholly pale, except for a slightly sinuous, dark streak on each side, rest of thoracic notum and pleura largely pale; the small spots on the abdomen of the type are here greatly extended and run together, so that there is left above only a median dark line on apical part, and a lateral dark streak, more or less broken on all except the apical segment. The male appendages are like the typical form.

The legs are almost wholly pale. Size is as in the typical form.

*Holotype*, (No. 4913, Mus. Calif. Acad. Sci., Ent.) from **San Domingo (Magdalena Plain), Lower California, July 19 (M. & R.)**.

Paratypes come from San Domingo, 19, VII; five miles south of Miraflores, 10, VII; ten miles southwest of San José del Cabo, 9, VII; Venancio, 17, VII; twenty-five miles south of Santa Rosalia, 25, VII; fifteen miles west of La Paz, 5, VII; fifteen miles north of El Refugio, 4, VII; and Santiago, 8, VII.

**Maracandula minima** Banks, new species

Plate 8, figures 7, 9 and 14

Face with a brown interantennal mark; vertex with a brown spot each side; tips of labial palpi but little swollen, partly dark; antennae pale on basal joint, ring joint nearly black, beyond yellowish brown to near the club, then several joints very pale, then several joints black, beyond paler. Pronotum little marked, usually the front part is brown on the sides, with a pale median stripe, behind with little indication of spots, but often a dark, rounded area each side; rest of notum gray to brown, little spotted; pleura mostly brownish; abdomen pale brown, above with a small pale spot at base, and a large one toward middle of nearly all the segments, hair mostly white; legs pale, tips of tibiae and tarsal joints dark, and sometimes tips of femora, hair and bristles mostly white; pronotum and pleura with some long white hair.

Wings with brown venation, often interrupted with pale; in fore wing the alternate radial cross-veins are bordered with brown, a larger spot at union of anal and cubital fork, and a small one at rhexma, a few less distinct along cubitus, and none between radius and subcosta; hind wings with small brown spot at rhexma; stigma whitish.

Structure in general similar to *M. bellula*. The fore wings much more slender toward tip, the rhexma much nearer to the hind margin than to the outer margin, and this rhexma formed of one fairly long and one very short vein (in *bellula* the parts more equal). In fore wing there are usually five cross-veins before the radial sector, five branches to radial sector, the outer costals are usually forked, and sometimes a few connected; eight or nine branches to first anal vein, two or three cross-veins in apical area, the cubital fork is much before the first branch of radial sector; the venation, in general, fairly regular; in hind wing two cross-veins before radial sector.

Length of fore wing 10 to 15 mm., width 2.5 to 4.5 mm.

Length of hind wing 10 to 14 mm., width 1.9 to 4 mm.

*Holotype*, (No. 4919, Mus. Calif. Acad. Sci., Ent.) from **San Miguel, Lower California**, July 3, 1938 (M. & R.).

Paratypes from five miles south of San Miguel, 20, VII; fifteen miles north of Punta Prieta, 29, VII; and San Miguel, 3, VII.

Differs from *bellula* in more slender wings, more regular venation, fewer brown marks on wings, more spots on abdomen. *M. pygmaeus* Hagen, described from Mexico, has four cross-veins before radial sector in hind wings, five in fore wings, the cubital fork is as far out as first branch of radial sector, and the anal vein runs far out. I saw the type in Berlin.

### ***Chaetoleon variabilis* Banks, new species**

Plate 8, figures 4 and 5

Interantennal mark deeply indented in middle below, and often with three dark lines extending below, one each side and one in middle; last joint of labial palpi dark; basal joint of antennae pale, beyond brown, annulate with pale, usually some joints near club yellowish, then a few joints very dark; then yellowish on the club; in male the colors are in greater contrast. Vertex with a row of dark spots, and behind are two or three large, dark areas, sometimes connected, and some brown spots each side on occiput. Pronotum with a median pale line, each side of which are three brown spots, often united into a stripe, and laterally a short, brown stripe which ends on the groove in a rounded spot; sometimes these dark marks are more connected, leaving only a narrow median pale line and a few small, pale spots each side.

Mesonotum brown, with many pale spots, scutellum with two dark, submedian lines in front, a dark line each side behind, and a dark spot on middle of hind border; the black hairs on front of mesonotum and on middle of pronotum are stout, but not thickened; the pronotum has a few long, white hairs each side.



The metanotum is mostly pale, the metascutellum pale behind, with three dark lines, the median one forming a T. Abdomen brown, above with a pale spot near middle of each segment, and sometimes smaller ones at tip of each segment; in many specimens, especially females, the pale on second and third segments is extended to form irregular stripes each side; the venter is usually also more or less varied with pale; hair is mostly white, but some dark above on the dark areas.

Legs pale; tips of tibiae and of tarsal joints dark, often some small dots or spots on tibiae; femora with dark spots on outer side and a dark band somewhat before tip; bristles mostly white, but some on hind legs dark, front femora with a row of long white hairs above.

Wings with mostly brown veins, interrupted with white, many cross-veins wholly white, others wholly dark, usually a few small brown clouds in the subcostal area, about five to seven radial cross-veins bordered with brown, often some spots along cubitus, a dark line from rhexma up over several cross-veins, many outer forkings dark; hind wings with no distinct marks except the pale stigma.

Last joint of labial palpi distinctly enlarged, much more than in *pusillus*. Pronotum hardly longer than broad, sides nearly parallel. Wings broader than in *pusillus*; the fore wings have the costal area broadened, always with several costals forked, often many of them, and nearly always with at least one connecting veinlet and sometimes almost wholly two-celled to near the base; usually three cross-veins before the radial sector, but sometimes only one or two; usually seven branches to the radial sector; nine or ten branches of first anal; usually a few cross-veins in apical costal area; hind wing slender, two cross-veins before radial sector, five to seven branches of radial sector, anal vein ends at about forking of cubitus, and sometimes one connecting veinlet to cubital fork, spurs of front legs but little more than first joint, of hind pair equal to first joint.

Length of fore wings 13 to 23 mm., width 3 to 6 mm.

Length of hind wings 12 to 22 mm., width 2.4 to 4.6 mm.

*Holotype*, (No. 4914, Mus. Calif. Acad. Sci., Ent.) from **Triunfo, Lower California**, July 13 (M. & R.).

Many paratypes from Miraflores, 8, VII; five miles south of Miraflores, 10, VII; twelve miles southwest of San José del Cabo, 9, VII; Santiago, 8, VII, Chapala Dry Lake, 21, VI; Comondu, 22, VII; Triunfo, 13, VII; six miles north of Triunfo, 15, VII; fifteen miles west of La Paz, 5, VII; San Domingo, 19, VII; Venancio, 17, VII; fifteen miles north of El Refugio, 4, VII; 20 miles northwest of La Paz, 16, VII; five miles west of San Bartolo, 13, VII; and San Fernando, 31, VII.

An extremely variable species, in this respect recalling *Cryptoleon signatum* from the eastern United States.

**Chaetoleon pusillus** (Currie)

*Brachynemurus pusillus* CURRIE, Can. Ent., XXXI, 363, 1899.

*Chaetoleon pusillus*, BANKS, Bull. Mus. Comp. Zool., LXVIII, 57, 1927.

Specimens from San Domingo, 19, VII; five miles south of San Miguel, 20, VII; ten miles south of Catavina, 29, VII; Venancio, 17, VII; Miraflores, 8, VII; ten miles southwest of San José del Cabo, 9, VII; and seventeen miles south of Enseñada, 14, VI. Described from Arizona and known from New Mexico and Utah.

The two species can be separated by this table:

Hind femora reaching much beyond the first segment of abdomen; hind tibiae much longer than hind femora; hind tibia with only black bristles; pronotum but little wider behind than in front; first vertex row entire; costal area with connecting cross-veins. . . .	<i>pusillus</i>
Hind femora reaching only a trifle, if any, beyond the first segment of abdomen; hind tibiae but little, if any, longer than femora; some white bristles on hind tibiae; pronotum plainly wider behind than in front; first vertex row usually broken into three sections; costal area of fore wings usually two-celled in at least a few places. . . .	<i>variabilis</i>

**Austroleon barberi** (Currie)

Plate 8, figures 8 and 11

*Brachynemurus barberi* CURRIE, Proc. Ent. Soc. Wash., V, 282, 1903.

*Austroleon barberi*, BANKS, Bull. Mus. Comp. Zool., LXVIII, 55, 1927.

This species has been known only by the female type from Hot Springs, Arizona.

Various specimens come from Comondu, 22 July; Miraflores, 8 July; and six miles north of Triunfo, 15 July. It is easily recognized by the pronotal marks, the very large tip to the labial palpi, and in that the black mark at base of the snow-white stigma extends obliquely back on the radial sector in both wings. The hair on abdomen is largely white, but toward base above there is some black hair. There are usually three cross-veins before radial sector in fore wing, sometimes but two, and usually two before sector in hind wings, but sometimes three; six or seven branches to the radial sector, the fourth usually appears as a separate radial sector; in fore wing the first branch of the radial sector arises much beyond the end of first anal vein; nine to eleven branches to the first anal; usually few, if any, costals before stigma forked; a few cross-veins in apical costal area; hair on the veins is extremely scanty and very short.

The last segment of abdomen of male is almost twice as long as high, and plainly a little shorter than the preceding segment; the male appendages are two parallel processes covering the posterior end of the last segment, not projecting.

**Eremoleon nigribasis** Banks

*Eremoleon nigribasis* BANKS, Bull. Mus. Comp. Zool., LXIV, 1920; *ibid.*, LXVIII, 71, 1927.

Specimens from Venancio, 17, VII; and twenty miles northwest of La Paz, 16, VII.

Described from Utah, and known also from Arizona and New Mexico.

**Eremoleon affine** Banks, new species

A black band below bases of the antennae, above dark, but not so distinct, anterior row across vertex indistinct, posterior row of two large, submedian spots; antennae pale on a few of the basal joints, beyond brown, last joint of labial palpi scarcely darkened. Pronotum gray-yellowish, with four black lines, submedian pair more separated at groove than elsewhere, lateral pair somewhat sinuous and broken, the short bristles are black, but on sides some white hair; meso- and metanotum also yellowish, spotted, mostly through the middle, with black; scutelli with two black spots; a large black spot below base of front wings, and one behind base of hind wings; pleura yellow, with a broken, black streak; abdomen below yellowish on basal half, beyond mostly dark, above dark, but with a yellowish spot before middle of each segment, sometimes those toward tip small; hair extremely short and mostly white.

Legs pale, dotted with dark, tips of tibiae with a black band, tips of tarsal joints but little darkened; bristles slender and mostly black; spurs equal three tarsal joints in front legs, and fully two joints in hind legs.

Wings with black veins, interrupted with white; a dark spot at base of stigma, a fainter mark at end of anal vein, and another at rhagma. In some specimens the junction of many veins is plainly bordered with dark.

Structure similar to other species. In the fore wings five to seven cross-veins before the radial sector, nine to ten branches of the radial sector, eleven to fourteen branches of the first anal vein; a row of cross-veins in apical costal area; often one cell before radial sector is crossed.

Length of fore wing 23.5 to 33 mm., width 6 to 9.5 mm.

Length of hind wing 22 to 31 mm., width 5.5 to 7.5 mm.

*Holotype*, (No. 4915, Mus. Calif. Acad. Sci., Ent.) from **Miraflores, Lower California**, July 8.

Specimens from Miraflores, 8, VII; Venancio, 17, VII; five miles south of San Miguel, 20, VII; and one from Mejia Island, Gulf of California, 28, VI, (E. P. Van Duzee).

Separated from the other known species in the following table :

- 1. Costal area from extreme base to the first cross-vein jet black; scutelli with dark spots; not many hyaline cross-veins..... *nigribasis* Banks
- Costal area not black at extreme base..... 2
- 2. Vertex in front with a transverse row of three or four spots; scutelli scarcely marked; no black spot below base of fore wing..... 3
- Vertex with two large, subtriangular dark spots, and sometimes a transverse line in front; scutelli each with two black spots, a large deep black spot below base of fore wing ..... *affine*
- 3. Four spots in the row on front of vertex, many cross-veins hyaline..... *macer* Hagen
- The median pair of spots united, interantennal mark very large, fewer cross-veins pale; all parts, especially antennae and legs more elongate than in *macer*.... *longior* Banks

**Psammoleon normalis** Banks, new species

Plate 8, figures 10 and 16

Face with a large interantennal mark, below emarginate in middle, above reaching nearly to the vertex, latter with two rows of black spots, the middle spot of front row partly divided, when fresh it is almost velvety; antennae brown, a few basal joints pale; palpi pale, last joints of labials with an elongate black spot.

Pronotum mostly black, usually with a gray bloom, a pale median line before groove, and the sides with one or two pale spots, posterior part showing more or less plainly one or two pale areas; meso- and metanotum mostly black, with gray bloom, which, when rubbed, shows a number of pale spots; mesoscutellum with one each side and hind border pale, metascutellum with hind border pale.

Abdomen black, with the same gray bloom, usually four pale spots each side above; hair below short and white. Front femora mostly dark above except base, and mid and hind femora heavily spotted with dark, all tibiae spotted, tarsal joints dark at tips; front coxae with comb of long white hairs, femora with mostly short white hair and white bristles, hind tibiae with only black bristles, front and mid tibiae with mostly white ones. Pleura dark, with long white hair.

Wings with black veins, broken with white; fore wings with a large oblique white area just above rhexma, a black line obliquely up from end of anal, and another up from rhexma, many outer forkings dark, stigma pale, dark on base; hind wing with some outer forkings dark.

Pronotum about as long as broad, slightly broader behind, only short black hairs, no white ones on the sides. Legs moderately short and stout; spurs stout and curved, front spurs equal three tarsal joints, others only two.

Fore wings with about seven cross-veins before the radial sector, latter with about nine or ten branches, some cross-veins in apical costal area, nine or ten branches of first anal vein, second anal forked. In hind wings nine or ten branches to radial sector, about four branches to first anal vein, and one veinlet up to cubital fork, second anal with one branch behind and one up to first anal.

Length of fore wings 27 to 29 mm., width 6 to 8 mm.

Length of hind wings 26 to 27 mm., width 5 to 6 mm.

*Holotype*, (No. 4916, Mus. Calif. Acad. Sci., Ent.) collected at **Venancio, Lower California**, July 17 (M. & R.).

Paratypes come from San Fernando, 1, VIII; Venancio, July 17; fifteen miles north of Punta Prieta, July 29; forty-five miles north of San Ignacio, July 27; fifteen miles west of La Paz, July 5; San Domingo, July 19; twelve miles south of Santa Rosalia, June 27; twenty miles northwest of La Paz, July 16; six miles north of Triunfo, July 15; and Coyote Cove, Concepcion Bay, July 24.

**Psammoleon femoralis** Banks, new species

Plate 8, figures 13 and 17

Two dark spots on clypeus; large interantennal mark below and well above antennae; vertex with two transverse rows of black spots, anterior one slender, middle spot broad, pointed behind, hind row with two spots near middle; antennae very dark, tip paler; labial palpi with last joint much swollen and mostly black; pronotum mostly black, with a gray bloom, front part with a median pale line, and the side margins pale, posterior part showing faintly a pale spot each side and traces of a median pale line; mesonotum black, with gray bloom, a pale spot each side on anterior lobe, lateral lobes with pale margin on inner side; mesoscutellum with pale medium spot behind; metanotum largely dark, as also the pleura; abdomen black above, with a pale median spot before middle of each segment, smaller on posterior segments; hair beneath white.

Legs heavily spotted with black, front and hind femora almost wholly dark above, with mostly white hair, tibiae and tarsal joints black at tips, the long bristles mostly black.

Wings with dark veins, but some interrupted with white; fore wings have a black line obliquely up from end of anal vein, ending above in a much enlarged rounded spot, and a fairly large spot at rhexma, and a smaller spot over last radial cross-vein; hind wings with spot at rhexma, line up from anal vein, spot before white stigma, and on last few radial cross-veins. Pronotum with rather stout black hair in middle as well as on the sides, besides the minute hair; pronotum plainly longer than broad; legs very slender and delicate, the front femur not swollen towards tip, the spurs long, little curved except at tip, front and mid pairs equal three tarsal joints, hind pair a little more than two joints.

Wings with more elongate cells (except costals) than usual, radial sector as far out as end of the anal vein, six cross-veins before the radial sector, the cells here much longer than broad, about seven branches to radial sector, nine or ten branches to first anal, second anal vein forked. In hind wing about seven radial sectors, first nearly at middle of wing-length, three branches of first anal, none to cubital fork; in both wings a few cross-veins in apical costal area.

Length of fore wing 20 mm., width 4.5 mm.

Length of hind wing 18.5 mm., width 3.7 mm.

*Holotype*, (No. 4917, Mus. Calif. Acad. Sci., Ent.) from **20 miles N.W. La Paz, Lower California**, July 16 (M. & R.), and paratypes from twenty miles northwest of La Paz, July 16, and five miles south of San Miguel, July 20.

**Puren albovaria** Banks, new species

Plate 8, figures 3 and 6

A black, interantennal mark, sometimes nearly reaching vertex above, latter with two rows of black spots; last segment of labial palpi black, enlarged, pointed; antennae brown to black; pronotum dark, with a black stripe



each side, not pointed in front, broad behind; a pale median line margined with dark stripes; rest gray to yellowish; thoracic notum gray, with black spots and lines, and some small yellowish spots; mesoscutellum with three pale spots; pleura mostly pale, with some black patches, and long white hair. Abdomen black, with white hair; legs mostly shining black, tarsi almost wholly so, femur with some pale patches, especially the hind pair, tibiae of fore and mid pairs with pale band toward base, hind tibiae with much pale behind. Wings with much white on veins, long streaks and large patches are wholly white, more so in the hind wings; subcosta and radius both interrupted with dark, but more white than dark; a deep black stripe starts from the extreme base of wing, runs out along the lower edge of medius, stopping a few cells before the radial sector; a long, sinuous black line from end of anal vein curves up, then extends out straight to the rhexma where it bends obliquely upward toward the last radial cross-vein; there are black spots over several of the outer radial cross-veins, particularly the last two; a black mark at base of stigma, and over last two radial cross-veins.

In hind wings a dark spot at base of stigma.

In structure similar to *P. inscriptus*. Pronotum a little longer than broad, sides nearly parallel, with long, white hair, a row of curved ones on posterior sides. Legs moderately stout, front femur swollen, all with long white and some black hair, bristles mostly white, front coxae with comb of long, white hair, hair and bristles of tibiae mostly black. Front spurs equal to two tarsal joints, others nearly straight, little longer than the long basitarsus.

Wings acute at tips; fore wing with a double costal series almost to base, in some places three cells; about seven cross-veins before radial sector; about eleven or twelve branches of radial sector; about ten branches of first anal vein.

In hind wings ten branches to radial sector; four branches of first anal to margin, usually one or two to cubital fork. In both wings a few cross-veins in apical costal area.

Length of fore wing 25 to 28 mm., width 5 to 6.5 mm.

Length of hind wing 24 to 27 mm., width 4.4 to 5.3 mm.

*Holotype*, (No. 4918, Mus. Calif. Acad. Sci., Ent.) from **Venancio, Lower California**, July 17, 1938 (M. & R.); paratypes are from twenty miles north-west of La Paz, 16, VII; Triunfo, 13, VII; and Venancio, 17, VII.

### **Myrmeleon rusticus** Hagen

*Myrmeleon rusticus* HAGEN, Synopsis Neur. N. Am., 233, 1861.

*Myrmeleon rusticus*, BANKS, Bull. Mus. Comp. Zool., LXVIII, 78, 1927.

Many specimens from Chapala Dry Lake, 21 June; fifteen and forty-five miles north San Ignacio, 24 and 27 July; San Miguel, 3 July; Hamilton Rch., 2 August; Mesquital, 22 June; seventeen miles north of Enseñada, 14 June; Comondu, 22 July; ten miles south of Punta Prieta, 21 June; twenty miles north of La Paz, 16 July; San Domingo, 19 July; and Venancio, 17 July.

Mr. Van Duzee took specimens at San Marcos Id., Gulf of California, 19 June, and Angeles Bay, Gulf of California, 4 May and 25 June.

Described from western Texas and known from New Mexico, Utah, Arizona, and southern California.

**Paranthaclisis congener** (Hagen)

*Acanthaclisis congener* HAGEN, Synopsis Neur. N. Am., 224, 1861.

*Paranthaclisis congener*, BANKS, Bull. Mus. Comp. Zool., LXVIII, 80, 1927.

Specimens from Mesquital, 28 July; and from fifteen and forty-five miles north of San Ignacio, 24 and 27 July. Known from New Mexico, Arizona, southern California.

**Paranthaclisis hageni** (Banks)

*Acanthaclisis hageni* BANKS, Ent. News, X, 170, 1899.

*Paranthaclisis hageni* BANKS, Bull. Mus. Comp. Zool., LXVIII, 81, 1927.

Several from Venancio, 17 July; San Domingo, 19 July; and San Fernando, 1 August.

Described from Arizona; known from Texas, Kansas, and New Mexico.

**Vella hespera** (Banks)

*Acanthaclisis hespera* BANKS, Proc. Acad. Nat. Sci., Phila., 1914, 618; Bull. Mus. Comp. Zool., LXVIII, 84, 1927.

Specimens of this form were collected by Eisen and Vaslit and recorded in 1895 as *Acanthaclisis fallax* Rbr. Since then I have seen many more specimens of these large myrmeleonids. *Acanthaclisis fallax* was described by Rambur from "Guyane." The South American form and a similar species from central and eastern Mexico, *V. impostor*, have the costal area much more broadened near base than the *V. texana* Hagen and *V. hespera* Bks. from the southern United States. The Baja Californian species agrees with *V. hespera*.

Specimens in this collection come from fifteen miles north of San Ignacio, 26 July; Triunfo, 13 July; and Mesquital, 28 July.

Described from New Mexico, and recorded from Arizona.

PLATE

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## EXPLANATION OF PLATE

### PLATE 8

- Fig. 1. *Scotoleon congener*, tip of abdomen of male.  
Fig. 2. *Netroneurus pulchellus*, tip of abdomen of male.  
Fig. 3. *Puren albovaria*, hind tarsus.  
Fig. 4. *Chaetoleon variabilis*, scutelli.  
Fig. 5. *Chaetoleon variabilis*, pronotum.  
Fig. 6. *Puren albovaria*, pronotum.  
Fig. 7. *Maracandula minima*, pronotum.  
Fig. 8. *Austroleon barberi*, tip of abdomen of male.  
Fig. 9. *Maracandula minima*, tip of abdomen of male.  
Fig. 10. *Psammoleon normalis*, hind tarsus.  
Fig. 11. *Austroleon barberi*, tip of labial palp.  
Fig. 12. *Netroneurus pulchellus pallescens*, pronotum.  
Fig. 13. *Psammoleon femoralis*, hind tarsus.  
Fig. 14. *Maracandula minima*, tip of abdomen from behind.  
Fig. 15. *Hesperoleon peninsulanus*, hind tarsus.  
Fig. 16. *Psammoleon normalis*, tip of labial palp.  
Fig. 17. *Psammoleon femoralis*, tip of labial palp.

